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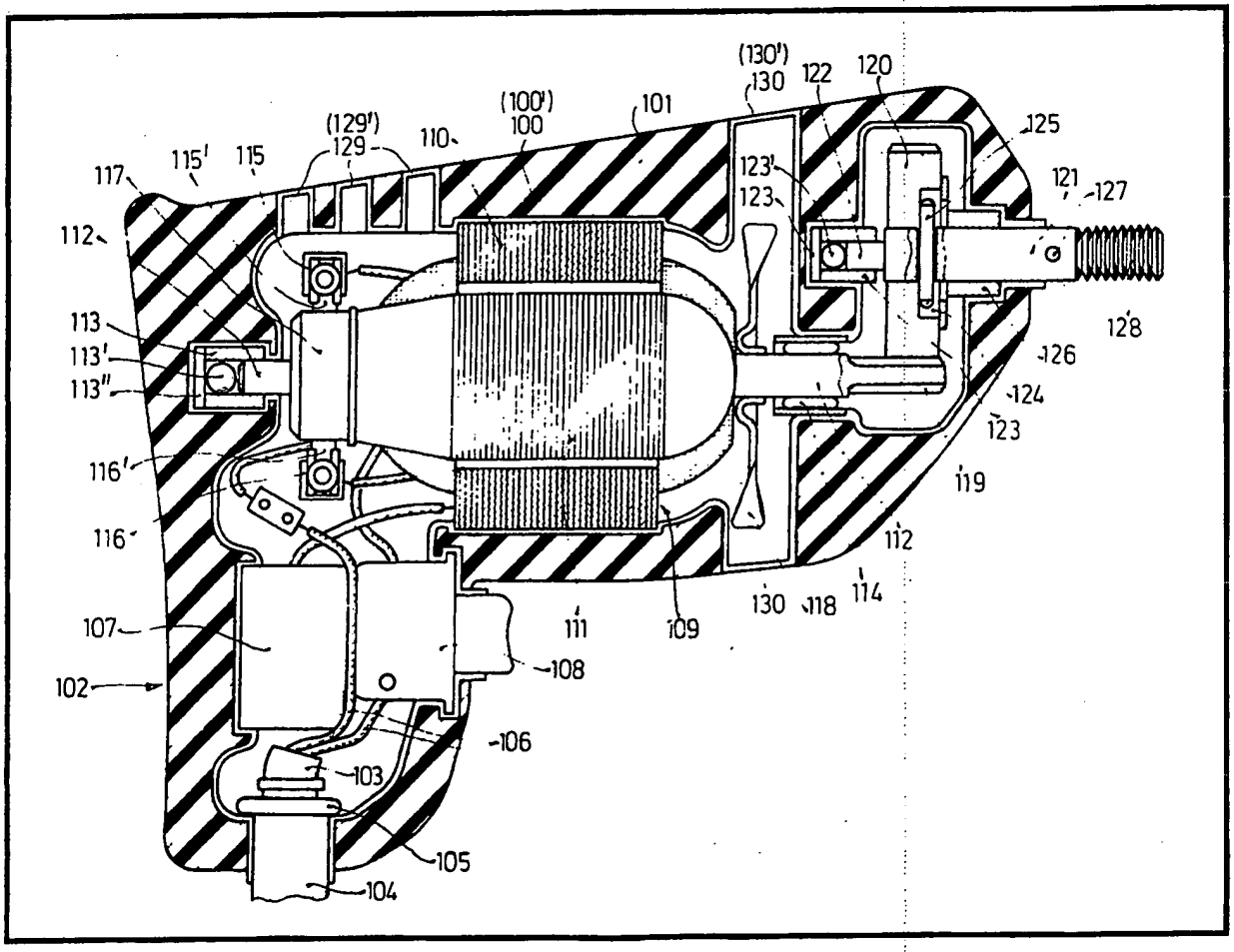
(54) A power tool housing

(57) A unitary plastics housing (101) for power tools consists of a load bearing structural foam with a cellular core and compacted surfaces and closely surrounds a thin wall inner housing with improved heat conductivity in the region of the bearings 113, 114 inserted in the inner housing and generating frictional heat. The inner housing is made up of two shells (100, 100'), for example deep drawn, and formed substantially as mirror images, and is produced from a plastics admixed with metal particles or laminated with metal foil or from metal. The housing has openings 129, 130 at the commutator 117 and fan 118 of the tool motor 111.



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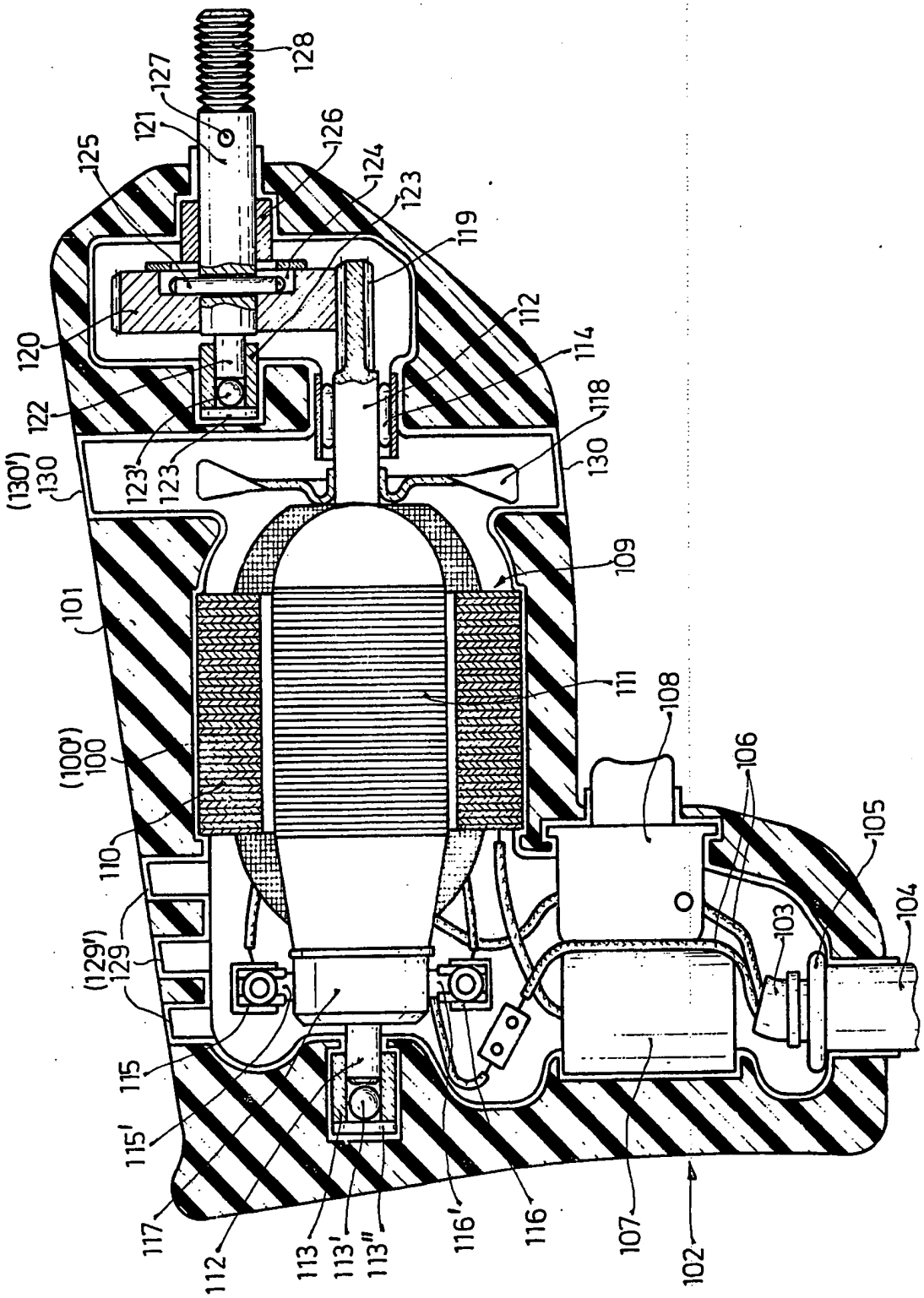
128
127
121
126
125
124
123
119
120
112
114
122
118
123'
123
130
(130')
130
109
101
111
108
(100')
100
106
105
110
104
103
(129')
129
115
115'
117
112
113
113'
113"
116'
116
107
102

SPECIFICATION

A plastics housing especially for power tools

The invention originates from a plastics housing for a power tool according to the type set forth in the main claim. A load-bearing plastics housing of structural foam material with a cellular core, has been disclosed in the main patent 21 52 585, which is produced by foaming of an inner housing made up of two thin walled shells made substantially as mirror images. The shells consist of plastics and are either deep drawn or pressed. In the course of the generally usual increase in the performance of power tools, attempts have been made to provide these higher performances whilst retaining, as much as possible, the original size of housing. However, with a plastics housing of the type referred to, this could mean that, due to the lower heat conductivity of the structural foam material produced with respect to solid plastics material, undesirably high heating of the thermoplastic inner housing and also of the outer plastics housing occurs adjacent to the bearings of the motor and of the gearing generating the frictional heat.

Advantages of the invention

The plastics housing in accordance with the invention made of structural foam material comprising the characterising features of the main claim has the advantage that frictional heat generated in the bearings is distributed by an inner housing having an improved heat conductivity to larger areas of the inside of the plastics housing located on the outside. This produces an improved heat dissipation transversely through the plastics housing and thus produces lower temperatures in the region of the bearings. The inner housing provided with the improved heat conductivity also delivers greater quantities of heat to an air flow which is guided through the machine for cooling the machine. Thus, due to the improved heat dissipation, the danger of an inadmissible heating of the plastics housing occurring is reduced.

Materials and combinations of materials from which the improved heat conducting inner housing can be produced in an advantageous manner, are set forth in the sub-claims.

Drawing

An embodiment of the invention is illustrated in the drawing and is described in detail in the following specification.

Description of the embodiment

In the following, by "working end" is to be understood the direction towards the workpiece to be worked on by the hand drilling [illegible] "hand end" is to be understood the opposite direction.

A thin walled inner housing of bi-foliate form consists of the shells 100 and 100'. As material for the shells 100, 100', either a plastics is used which is mixed with metal particles to improve heat conduction or is combined with at least one metal foil or sheel metal is used. The inner housing closed in any desired manner is surrounded by a unitary foam material housing 101 on which is formed a handle 102. A supply cable 103 is introduced into the handle through a sleeve 104 protecting against kinking, wherein the supply cable is secured against tension by a resilient ring 105 inserted in a peripheral groove in the cable. The wires 106 of the supply cable are connected to an electric driving motor 109, which is designed as a universal motor, through an anti-interference capacitor 107 and a press-button switch 108. The stator packet 110 of the driving motor is arranged in a corresponding recess in the inner housing shell 100. The rotor 111 of the driving motor is mounted on a motor shaft 112 which is mounted in two bearings 113 and 114 inserted in the inner housing shell 100. The hand end bearing 113 is formed as a plain bearing and is formed as a thrust bearing by using a ball 113' and a friction washer 113''; a needle bearing is provided as the bearing 114 at the working end.

The holders 115 and 116 for the carbon brushes 115' and 116' are likewise inserted in recesses in the inner housing shell 100. The carbon brushes act on a commutator 117 which is mounted at the hand end of the motor shaft 112 in front of the motor armature 111. A fan 118 is fixed on the motor shaft at the working end in front of the motor armature 111.

The working end of the motor shaft 112 is formed as a pinion 119. It engages in a gear wheel 120 which is mounted on a tool spindle 121. By means of a pin 122 formed at the hand end, the tool spindle is mounted in a plain bearing 123 inserted in the inner housing shell 100' and which is formed as a thrust bearing by using a ball 123' and a friction washer 123''. On its working side, the gear wheel 120 mounted on the tool spindle 121 has a narrow slot 124 proceeding across the centre in which engages a grooved pin driven transversely through the tool spindle. The grooved pin 125 transmits the torque from the gear wheel 120 to the tool spindle 121. The tool spindle is mounted in the closure wall of the inner housing shell 100 at the working end by means of a plain bearing bush 126. Outside the housing, the tool spindle 121 has a transverse bore 127 and a screw thread 128 at its working end. A chuck (not shown) can be screwed onto the screw thread 128 whereby the tool spindle can be prevented from rotating by means of a pin pushed through the transverse bore 127.

Recesses 129 are formed in the inner housing shell 100 in the region of the commutator 117 and recesses 130 are formed in the region of the fan 108, and which, after hardening of the surrounding foam housing 101, are pierced mechanically and then provide corresponding openings 129′ for the entrance and 130′ for the exit of cooling air.

The assembly of the housing takes place in the following manner:

The components are inserted in the inner shell 100, a counter shell 100′ (not shown) is mounted thereon and is connected to the shell 100 by latching engagement, welding or in some other manner. The inner housing consisting of the shells 100 and 100′ together with the inserted components is inserted in an exterior mould and enclosed in foam. After hardening of the foam, the slots 129′ and 130′ for the exit of cooling air are opened by machining, for example by punching or milling.

It is also possible to form the cooling air slots in the shells of the inner housing shortened and left open and to produce them in the exterior mould used for foaming, for example by inserted discs. Then the machined opening of the air slots after the foaming is omitted. This embodiment is chosen when, for example, the inner housing consists entirely of metal or of plastics laminated with metal foil. This arrangement prevents the user of the machine from being connected through the inner housing to parts of the machine possibly carrying voltage.

CLAIMS

1. A plastics housing for power tools the load bearing plastics mass of which consists of a foamed plastics which is formed as structural foam with a cellular core and a compact surface, and in which the plastics housing is connected to a closed, comparatively thin walled, bi-foliate inner housing which is surrounded integrally by the load bearing foam housing, according to Patent 21 52 585, characterised in that, the inner housing consists of a material having a good heat conductivity.

2. A plastics housing according to claim 1 characterised in that the inner housing consists of plastics with embedded metal particles.

3. A plastics housing according to claim 1 characterised in that the inner housing consists of at least one metal foil and at least one plastics layer combined therewith.

4. A plastics housing according to claim 1 characterised in that the inner housing consists of metal.

5. A plastics housing for a power tool, substantially as herein described with reference to the accompanying drawing.

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